



Pioneer, St. Gabriel

Why Mercury addition
to St. Gabriel

De Nora presentation on October 24, 2002

De Nora – Mercury Energy Saving Program (MESP) Implementation

To

- ◆ **Reduce Mercury emissions**
- ◆ **Achieve 3 - 5 years between cell openings**
- ◆ **Reduce Energy Consumption**

Rework existing installation

- Precision for Min. inter-electrode gap
- Stability of Performance which reduces Emissions
- Steps implemented to stabilize performance:
 - ❑ Rework / align cell bottom
 - ❑ Rework / align other cell components
 - ❑ Optimize process variables
 - ❑ **Stabilize cathode (Flowing Mercury layer)**

Implemented in all bell in Pioneer

A dark blue world map is centered in the background of the slide. The continents are shown in a lighter shade of blue, providing a global context for the presentation.

Stabilize Cathode – Flowing Mercury layer

- ◆ **Cell base plate condition**
- ◆ **Impacts of cell base plate**
- ◆ **Solution**
- ◆ **Benefits**

Stabilize Cathode – Flowing Mercury layer

◆ Cell base plate condition

- **Original 1970 installation**
- **Corrosion – ends / localized**
- **Pitting**

Not suitable for stable cathode

Stabilize Cathode – Flowing Mercury layer

◆ Impacts of cell base plate condition

- **Power consumption:**
 - **Cannot sustain targeted electrode gap**
- **Cost (Material / Labor) issues:**
 - **Damage to anodes**
 - **Brine washing**
 - **Mercury flow sensor failure**
 - **High frequency of cell bottom cleaning**
- **Increased maintenance**

Stabilize Cathode – Flowing Mercury layer

◆ Solution:

➤ Option 1

Replace existing with new cell base plates

◆ Cost prohibitive

➤ Option 2

Compensate for aged, corroded & pitted surface
by addition of mercury

◆ Save cost on cell base plate replacement

◆ Reduce frequency of maintenance

Option 2 was preferred

Stabilize Cathode – Flowing Mercury layer

- ◆ Additional mercury inventory criterion:
 - Additional thickness of 3.0– 3.5mm.

Target inventory: 165 flasks / cell

Stabilize Cathode – Flowing Mercury layer

◆ Measured benefits

- ❑ Frequency for brine washing dropped significantly**
- ❑ Cells can be operated at lower energy consumption without damaging anodes**
- ❑ Mercury flow sensor failure rate dropped dramatically**
- ❑ Reduction in frequency for cell bottom cleaning**

Conclusion

With implementation of De Nora - MESP
and addition of Mercury:

- ◆ Pioneer has created benefits by reduction in energy consumption & maintenance requirement.
- ◆ Mercury emissions are being reduced as an intended consequence.